

Bluetooth Emergency Lighting Combo Driver 3-in-1

HBEM01

Mains-driver (cc), Inverter, Self-Test, Motion&Daylight sensor

HYTRONIK®



Product Description

HBEM01 is a compact, dimmable Bluetooth LED driver with integrated emergency control, delivering a comprehensive solution for intelligent emergency lighting.

Properties

- Self - contained Emergency & LED drivers combination
- Non-maintained and maintained operations
- Mains & Emergency output (2W/3W) selection via DIP switch
- It is dimmable via switch - dim or Koolmesh app in maintaining mode
- Plug-and-Play sensor with Photocell Advance™ Technology for daylight & motion detection
- Active PFC design
- Abnormal protection for short-circuit, overload and open-circuit
- SELV classified (indicator LED, battery pack, test switch)
- Customized manual test switch (single press, long press)
- Battery Life Prediction and abnormal protection
- Wireless scheduling of monthly and annual EM tests via Koolmesh app
- Ideal for main lighting fixtures with emergency function requirements
- 5 years guarantee



Emergency Features

 Emergency working mode:

- Normal emergency mode
- Rest mode
- Inhibit mode
- Extended emergency mode



Monthly/Annually Automatic Testing with report generation



Battery status check via Koolmesh app



Automatic email notification when fault is detected



Retrievable usage data and report history

Batteries

- LiFePO4 batteries (BPC83/BPC84)
- Battery safeguarded from overcharge, deep discharge, and overheating
- 5 year design life for battery (up to 30 °C ambient temperature)
- 2 years guarantee (For battery compatibility refer to the Battery specifications)

*<https://hytronik.com/emergency-led-drivers-inverters/bpc83>

*<https://hytronik.com/emergency-led-drivers-inverters/bpc84>

App Features

-  Emergency report generation and diagnosis
-  Quick setup mode & advanced setup mode
-  Web platform for project deployment & data analysis
-  Koolmesh Pro iPad for on-site configuration
-  Floorplan feature to simplify project planning
-  One-key device replacement
-  Device social relations check
-  Staircase function for quick setup
-  Remote control via Hytronik gateway
& touch screen HPAD-TSJASE1
-  Heat map
-  Grouping luminaires via mesh network
-  Scenes
-  Schedule
-  Astro timer (sunrise and sunset)
-  Power-on status (memory against power loss)
-  Offline commissioning
-  Bulk commissioning (copy and paste settings)
-  Different permission levels via authority management
-  Network sharing via QR code or keycode
-  Interoperability with Hytronik Bluetooth product portfolio
-  Internet-of-Things (IoT) featured
-  Device firmware update over-the-air (OTA)
-  Alert for excess lux / temperature
/ humidity via multi-meter HBLM01
-  Seamless integration with BMS via Hytronik BMS gateway
-  Test mesh network connection quality
-  Compatible with Shelly emergency metering
-  Continuous development in progress...

APP Functions with Sensor Head

-  Dusk/Dawn photocell (Twilight function)
-  Detailed motion sensor settings
-  Tri-level control
-  Daylight harvest
-  Circadian rhythm (Human centric lighting)
-  Motion sensor trigger diagnosis
-  Motion sensor range test
-  Adjustable motion & static sensitivity & Adjustable sensing distance

Koolmesh® - Operating Guide

Bluetooth® 5.0 SIG mesh



Smartphone (ios)



Smartphone (Android)



iPad



Web

*For additional information, including project and network, device, and scenes, please refer to: <http://faq.koolmesh.com/faq/en/index.html>

Bluetooth® Kinetic Switch



HBKS01

HBKS02

HBKS03

HBKS01D

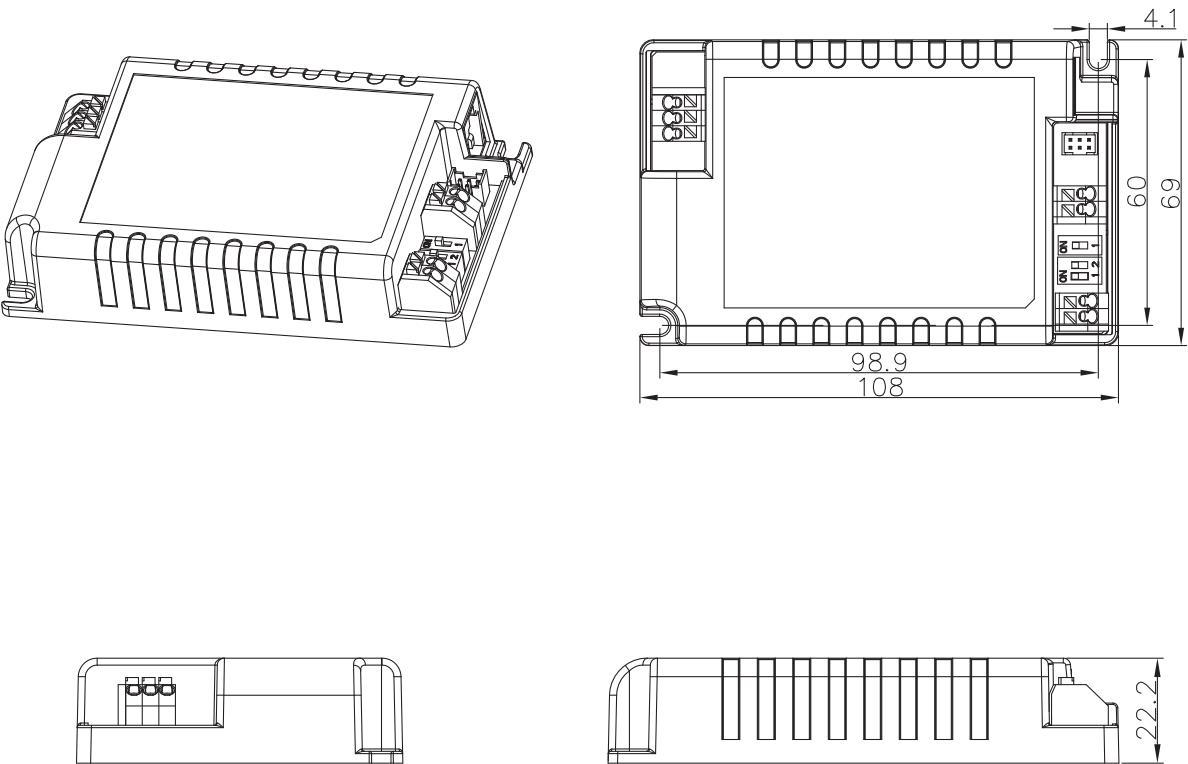
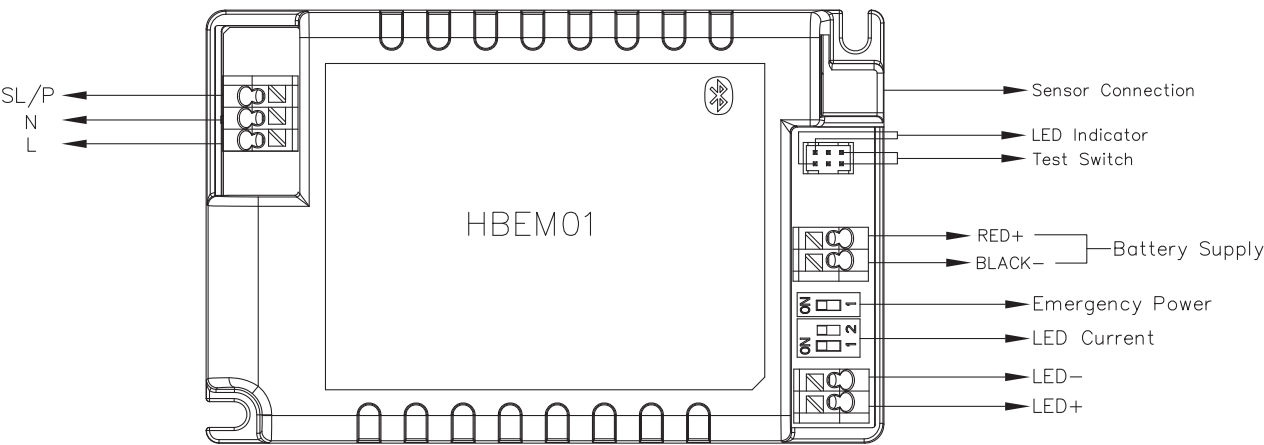
HBKS02D



EnOcean
Self-powered IoT

Fully support EnOcean self-powered switch module
PTM215B (HBES01/W & HBES01/B)

Mechanical Structure & Dimensions



Technical Specifications

Input & Output Characteristics	
Operating voltage	220~240VAC 50/60Hz
Input current	162~150mA
Max. Driver output power	25W
Max. Emergency output power	3W
Efficiency	85%
Uout Max.	60V
Power factor	>0.9
Main output (Wattage/Current/Voltage)	8-17.5W / 350mA / 24-50V 12-25W / 500mA / 24-50V 16-25W / 700mA / 24-36V
Emergency output (Wattage/Current/Voltage)	2W / 85-40mA / 24-50V 3W / 125-60mA / 24-50V
In-rush current (I _{max} .)	21A
Pulse time	80 μs

Bluetooth Transceiver	
Operation frequency	2.4 GHz - 2.483 GHz
Transmission power	4 dBm
Range (Typical indoor)	10~30m
Protocol	Bluetooth® 5.0 SIG Mesh

Environment	
Operation temperature	T _c : 0~+50°C
Storage temperature	T _c : -40~+70°C
Case temperature (Max.)	T _c : +80°C
IP rating	IP20

Safety & EMC	
EMC standard (EMC)	EN55015, EN61547, EN61000-3-2, EN61000-3-3, EN300328, EN301489-17
Safety standard (LVD)	EN61347-1, EN62493, EN61347-2-7, EN62034, IEC62133
Certification	CE, UKCA, RCM, ROHS

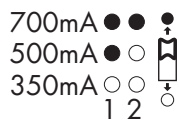
Circuit Breaker Information

Circuit breaker type	B10A	B13A	B16A	B20A	B25A
HBEM01	35 pcs	45 pcs	55 pcs	70 pcs	85 pcs

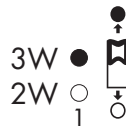
*Calculation uses typical values from ABB series S200 as a reference. E.g. Maximum amount = $16 / (P_n / 230)$. We recommend to use no more than 60% of the data as the actual max. number of drivers in real application. Actual values may differ due to used circuit breaker types and installation environment.

DIP Switch

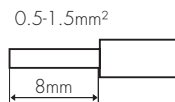
LED Current Selection



Emergency power Selection



Wire Preparation



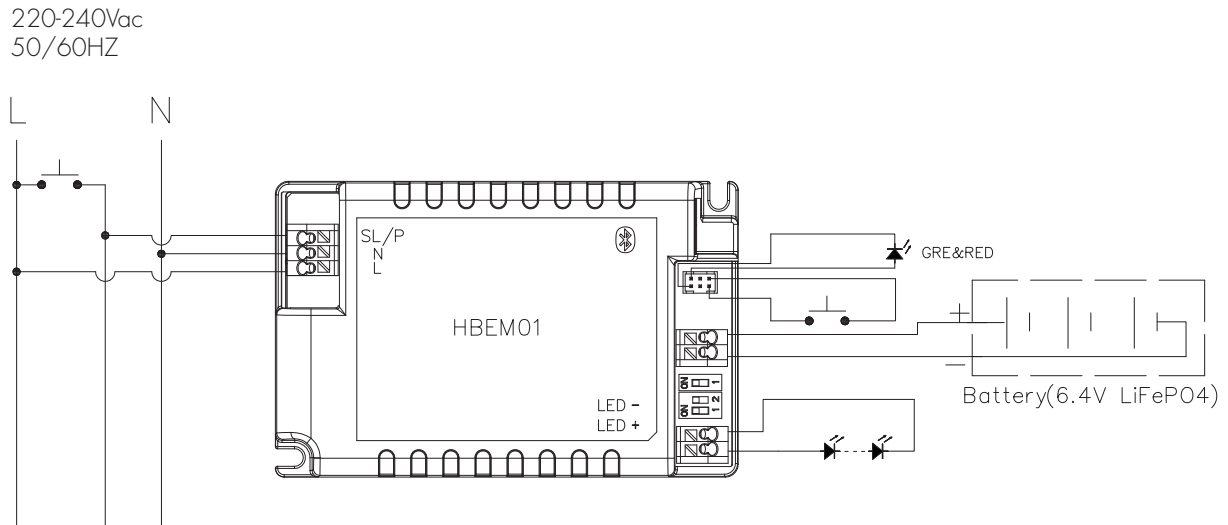
Solid or Stranded wire type 0.5 - 1.5mm²

To make or release the wire from the terminal, use a screwdriver to push down the button.

Wiring Diagram

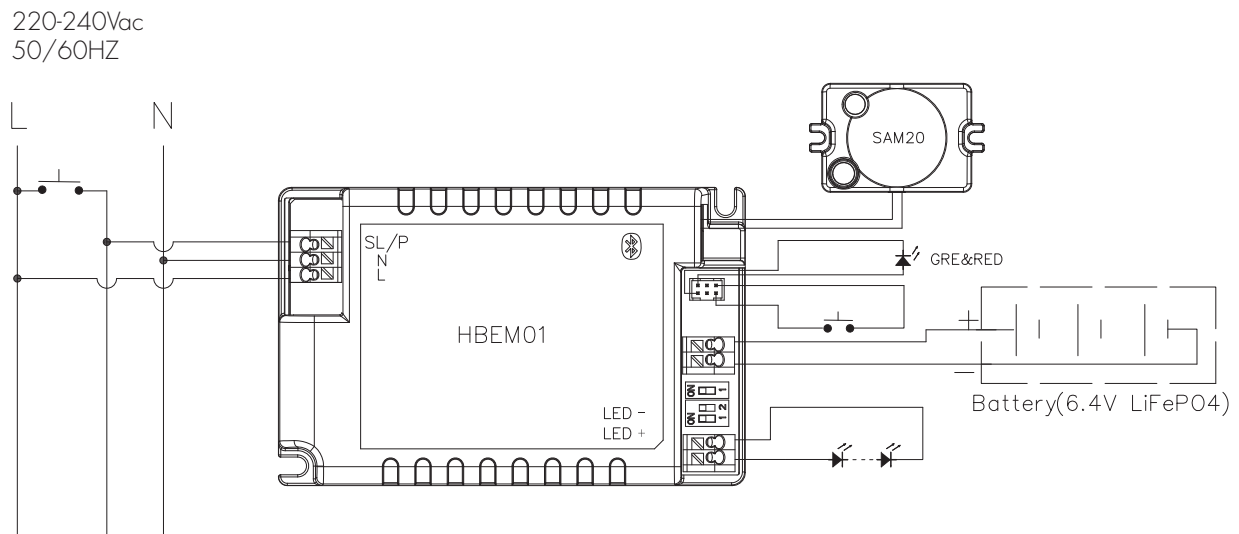
Without sensor head

*Without the sensor head, the driver functions as a standard emergency driver. The luminaire is controlled by switch or app under mains power, and in emergency mode it provides basic emergency lighting only.

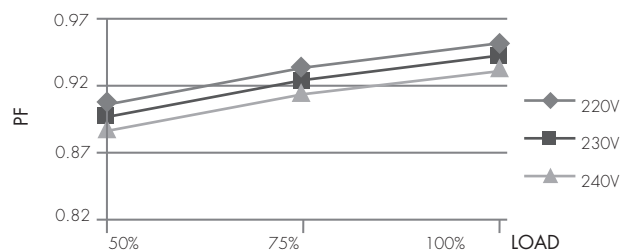
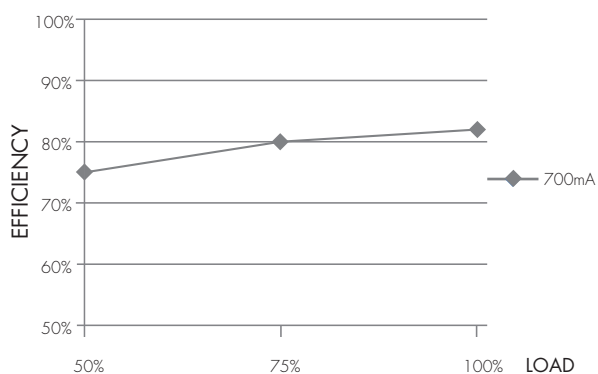


With sensor head

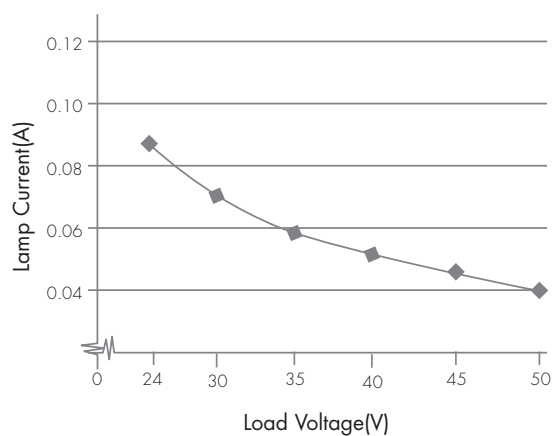
*Under mains power, the driver works with the sensor head for motion and daylight control. In emergency mode, the sensor is disabled and only emergency lighting is provided.



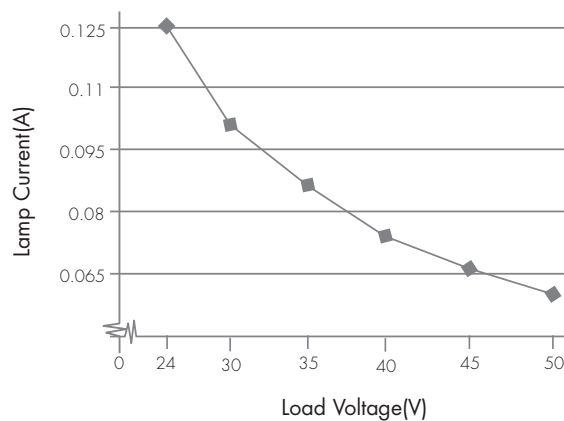
Performance Characteristics



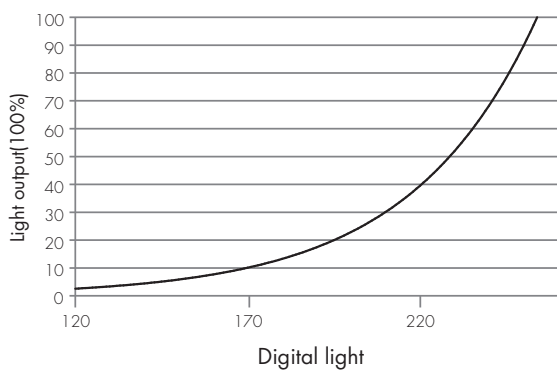
2W Output Current vs voltage



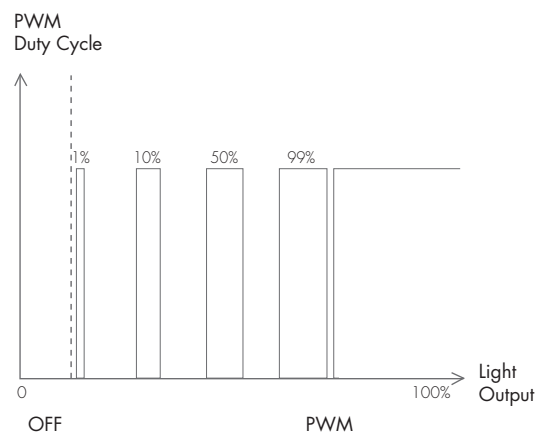
3W Output Current vs Voltage



Dimming Characteristics



Dimming Profile



Dimming range	Dimming technique
0%	OFF
1-100%	PWM

Operating Modes & Self-Test Functions

Normal Mode

It is the mode in which mains supply is available, with the battery either charged or charging. In this mode, the device operates as a combined Bluetooth LED driver, capable of creating scenes and being controlled by motion sensors, Push switches, and the mobile app.

Emergency Mode

It is the mode in which mains supply has failed and the control gear is powered by the battery until deep-discharge protection is reached. In this mode, the device cannot be controlled by motion sensors, Push switches, or the app. However, certain emergency parameters can still be configured via the app, such as scheduled self-test time, extended emergency duration, etc.

Rest Mode

It is the mode in which the luminaire is intentionally turned off while the control gear is powered by the battery. To enter this mode, mains supply must not be present. In this mode, the luminaire turns off automatically while the device continues to draw power from the battery. If the luminaire is forced on, the device will switch to emergency mode. When mains supply is restored, the device will return to normal mode.

Inhibit Mode

It is the mode in which the device is powered from the mains but prevented from entering emergency mode in the event of a mains failure. This mode is intended only for special applications where emergency functionality is not required, such as when electricians need to temporarily disable emergency operation during inspection or maintenance work.

Extended Emergency Mode

It is the mode in which the device continues operating the luminaire in the same manner as emergency mode for a programmed extended duration after mains power is restored. When enabled, the device remains in emergency mode even when mains supply returns. Once the programmed extended time expires, the device will switch back to normal mode.

Self-test (Monthly)

The device performs routine tests on emergency lighting based on pre-programmed schedules via the app or upon receiving manual commands. During the monthly self-test, load connections (e.g., open-circuit, short-circuit) and battery connections (e.g., open-circuit, short-circuit, polarity reversal) are inspected.

After the device reports a functional fault, a new monthly functional test shall be carried out after corrective actions to verify that the fault has been eliminated.

Self-test (Annually)

The annual test is mainly used to evaluate battery capacity and condition. The user must ensure that the battery is fully charged before the test begins. Battery lifetime statistics will be analysed and presented graphically.

When the device reports insufficient battery capacity and the battery is replaced, an annual test shall be performed to ensure that the new battery meets the required performance criteria.

Battery Installation and Protection

Battery Pack Options

Picture		
LED indicator & Test switch		
Battery pack	BPC83	BPC84
Battery Type	LiFePO4	LiFePO4
Discharge current	6.4V, 3.6AH	6.4V, 3.6AH
Size (mm)	105*53*27.5	174.8*26.5*29
Battery charge current	0 - 500mA	0 - 500mA
Max. load/ Discharge hour	0.4A, 2W@24 - 50V / 3H 0.56A, 3W@24 - 50V / 3H	0.4A, 2W@24 - 50V / 3H 0.56A, 3W@24 - 50V / 3H
Recharge Time	24H	24H

- Please kindly charge battery for 24 hours before using.
- Do not short-circuit the battery pack.
- Over-discharge can damage the battery. Please avoid deep discharge and recharge promptly after emergency use.
- Do not connect the battery before installing the product. Once the battery is connected, ensure the HBEM01 product powers on and operates normally within 24 hours.
- For more details on battery precautions and usage, please visit the following link:
<https://hytronik.com/service/downloads> (LiFePO4 Battery Precautions and Usage).

Battery-Powered Bluetooth Standby

(Only applicable to Bluetooth Emergency Drivers)

To support emergency system logging and monitoring, Bluetooth-enabled emergency drivers are designed to allow the battery to directly power the Bluetooth module when mains power is not present.

During this state, the Bluetooth module typically draws ~20mA from the battery.

Please take this standby consumption into account when assessing battery life in long-term mains-disconnected scenarios.

Installation Warning for Unstable Mains Supply

(Important for on-site building installations)

During building installations, mains supply may not be available on a continuous 24-hour basis. If the battery is connected under such conditions, it may lead to uncontrolled and excessive charge/discharge cycles, which significantly shorten the design life of the battery.

To prevent premature battery wear, ensure the battery remains disconnected until a stable 24-hour mains power supply is available. Please refer to the corresponding emergency driver datasheets for behavior under intermittent power supply.

This warning must be clearly communicated to the installation staff and electricians to ensure proper commissioning practices on-site.

LED Diagnostics

Indicator Colour	Status	Meaning
GREEN SOLID	Device OK	All OK, AC power is present. Battery is connected & charging
GREEN FAST FLASH (0.1s ON, 0.1s OFF)	Monthly test/Functionality test	AC power is present. Monthly test in progress
GREEN VERY SLOW FLASH (1s ON, 1s OFF)	Annual test/Duration test	Annual test are being carried out
RED SOLID	Emergency LED fault	Emergency LED is open circuit, short circuit or has otherwise failed in some way, . Fault can indicate the live status or the result of a test
RED SLOW FLASH (1s ON, 1s OFF)	Battery fault	Battery failure (Battery failed the duration or functional test, battery appears to be defective, battery has incorrect voltage).
RED /GREEN OFF	No power available	AC power is lost, unit in emergency mode

*If you want to see the diagnostic report, please go to the APP or web platform to see the full report and analysis

Note: Before powering on, please plug in the sensor head and then plug in the battery, otherwise the sensor is disabled.

Remedy: Only after the APP is reset and re-connected to the network can the sensor head be re-identified.

Technical Specifications for Sensor Heads

PIR Sensor Properties		
Sensor principle	PIR detection	
Operating voltage	5VDC	
Detection range *	HIRO5 & HIRO5/FM HIRO5/AA & HIRO7	Max installation height: 3m; Max detection range: 6m (diameter)
	HIR11	Max installation height: 15m (forklift); 12m (single person); Max detection range: 24m (diameter)
	HIR12	Max installation height: 15m (forklift); 12m (single person); Max detection range: 18m*6m (L*W)
	HIR63	Max installation height: 3m; Max detection range: 12m (diameter)
	HIR63/R	Max installation height: 12m (forklift); 8m (single person); Max detection range: 14m (diameter)

HF Sensor Properties		
Sensor principle	High Frequency (microwave)	
Operating voltage	5VDC	
Operation frequency	5.8GHz +/- 75MHz	
Transmission power	<0.2mW	
Detection range *	SAM20 & SAM21 SAM22 & SAM22/AA	Max installation height: 3m; Max detection range: 12m (diameter)
	SAM23	Max installation height: 15m (forklift); 12m (single person); Max detection range: 20m (diameter)

* The detection range is heavily influenced by sensor placement (angle) and different walking paces. It may be reduced under certain conditions.

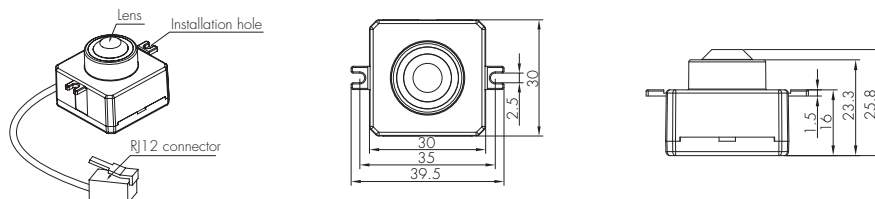
PIR & microwave sensor heads

The range of PIR and microwave sensor heads below offers powerful number of Plug'n'Play feature options to expand the flexibility of luminaire design. This approach to luminaire design reduces space requirements and component costs whilst simplifying production.

A. HIR05

PIR sensor head

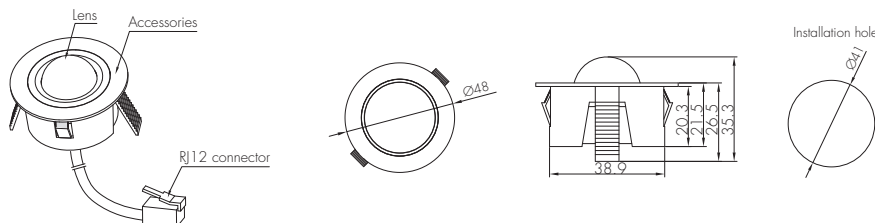
The cable length is around 65cm.



B. HIR05/FM

PIR sensor head

The cable length is around 65cm.

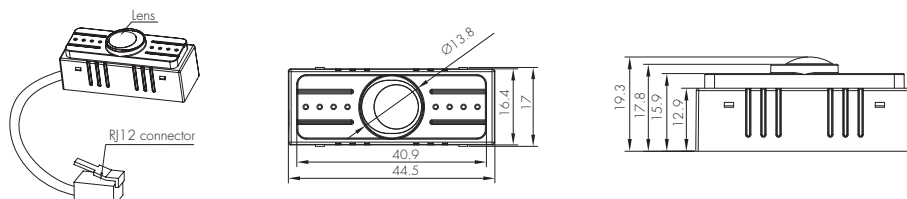


C. HIR07

PIR sensor head

Photocell Advance™

The cable length is around 30cm.



D. HIR11/S

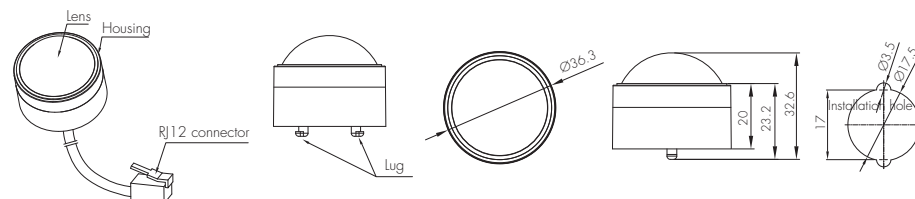
PIR sensor head

Surface mounting

For highbay application

IP65 (facia / lens part)

The cable length is around 65cm.



E. HIR11/F

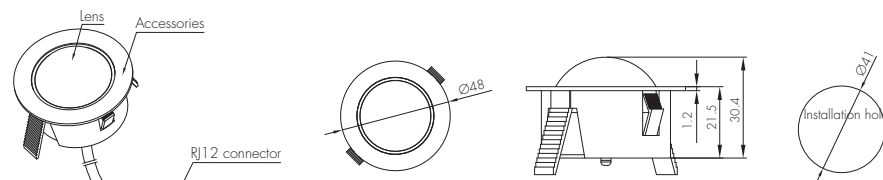
PIR sensor head

Flush mounting

For highbay application

IP65 (facia / lens part)

The cable length is around 65cm.



F. HIR11/C

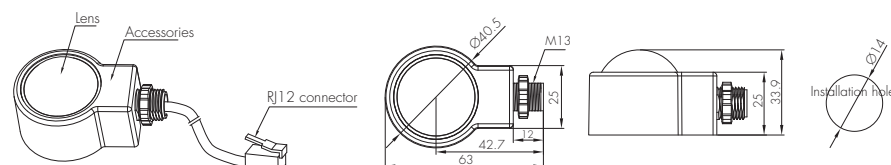
PIR sensor head

Screw to the luminaire by conduit

For highbay application

IP65 (facia / lens part)

The cable length is around 65cm.



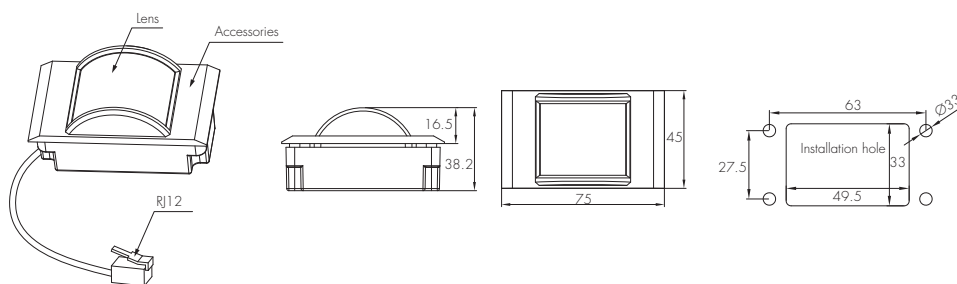
G. HIR12

PIR sensor head

For highbay application

IP65 (facia / lens part)

The cable length is around 65cm.



Installation for HIR12

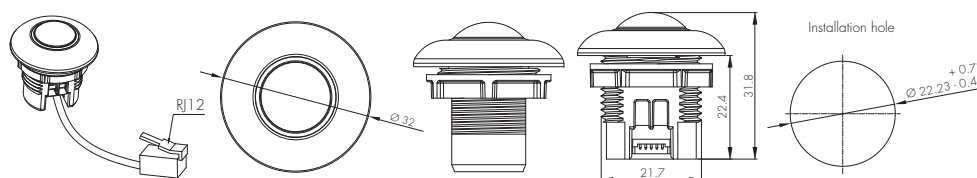


We suggest that the metal plate thickness to be 0.8mm – 1.6mm to ensure perfect focal length for the PIR lens.

H. HIR63

PIR sensor head

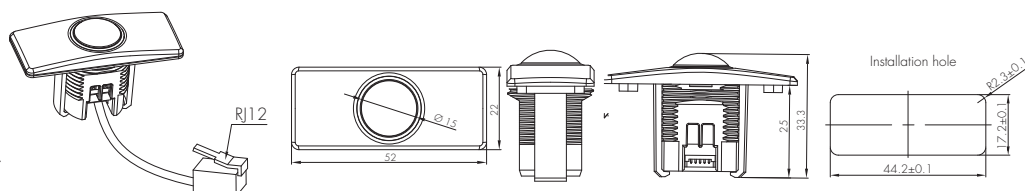
The cable length is around 65cm.



I. HIR63 with HA04

PIR sensor head

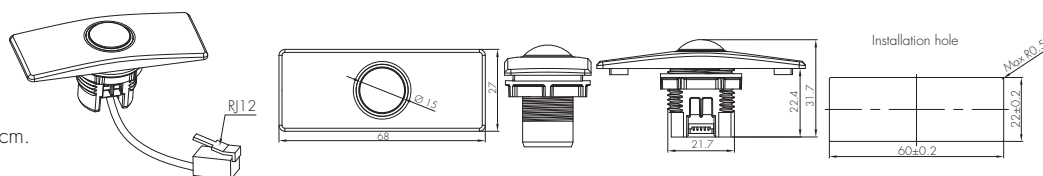
The cable length is around 65cm.



J. HIR63 with HA05

PIR sensor head

The cable length is around 65cm.

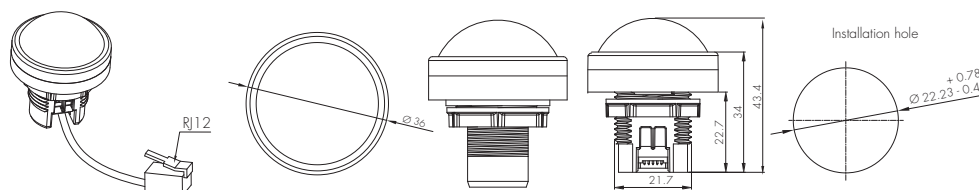


K. HIR63/R

PIR sensor head

IP65 (facia / lens part)

The cable length is around 65cm.

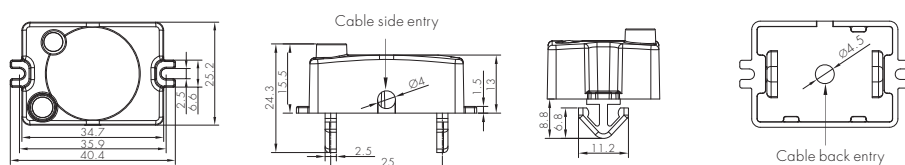


L. SAM20

HF sensor head

Photocell Advance™

The cable length is around 30cm.

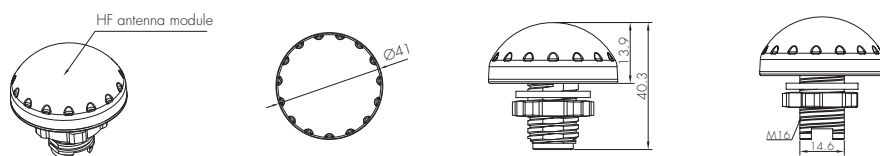


M. SAM21

HF sensor head

IP65

The cable length is around 65cm.

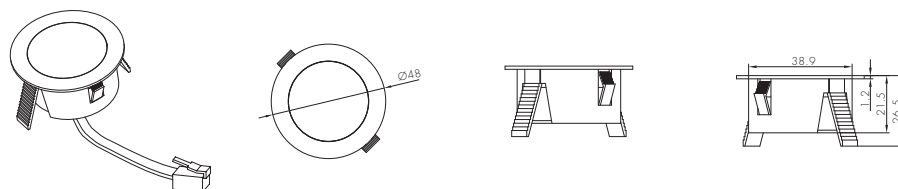


N. SAM22

HF sensor head

Flush mount

The cable length is around 65cm.

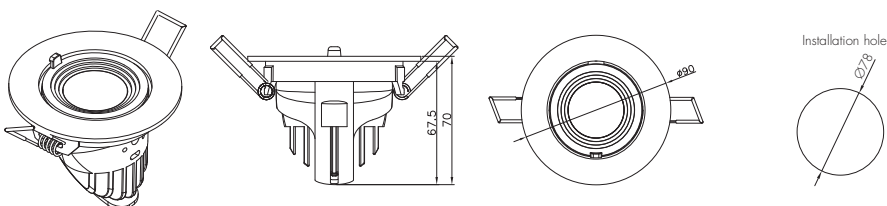


O. SAM22/AA

HF sensor head

Adjustable angle

The cable length is around 65cm.



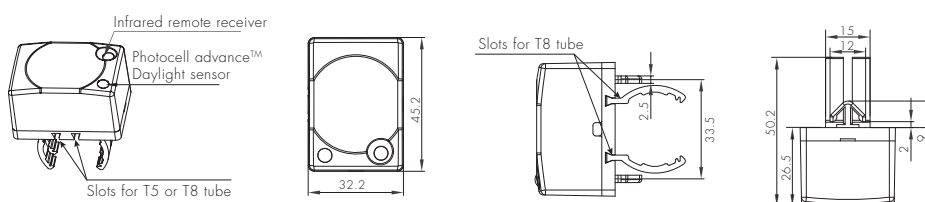
P. SAM23

HF sensor head

Photocell advance™

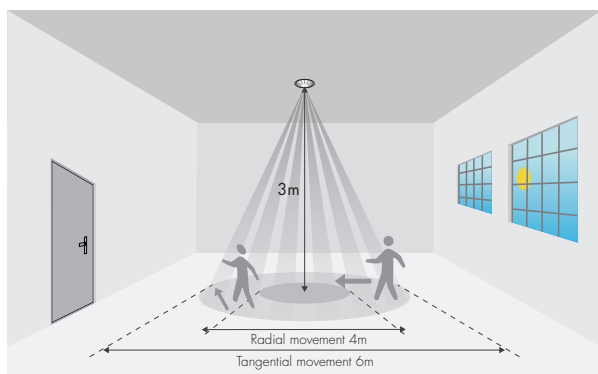
For highbay application

The cable length is around 30cm.

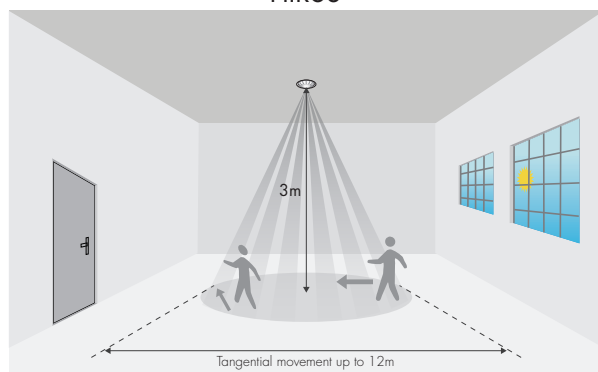


Detection Diagram

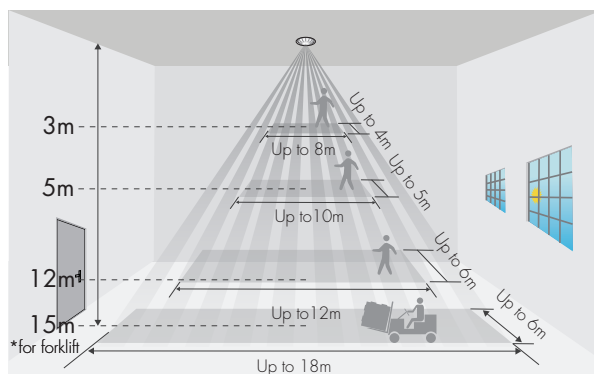
HIRO5 & HIRO5/FM & HIRO5/AA & HIRO7



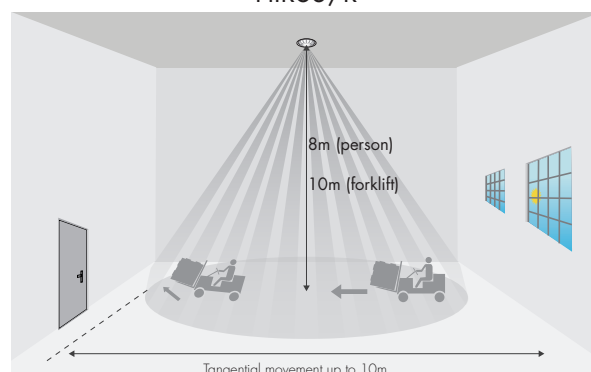
HIR63



HIR12



HIR63/R

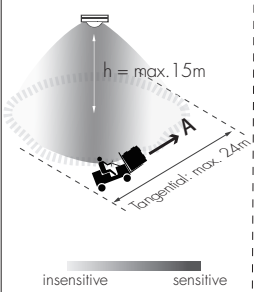
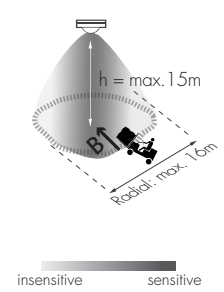


*The detection patterns are based upon 5km/h movement speed.

HIR11 Series (High-bay)

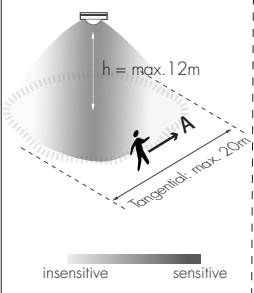
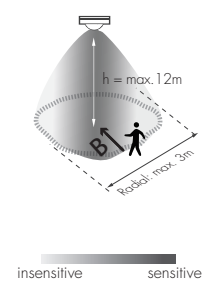


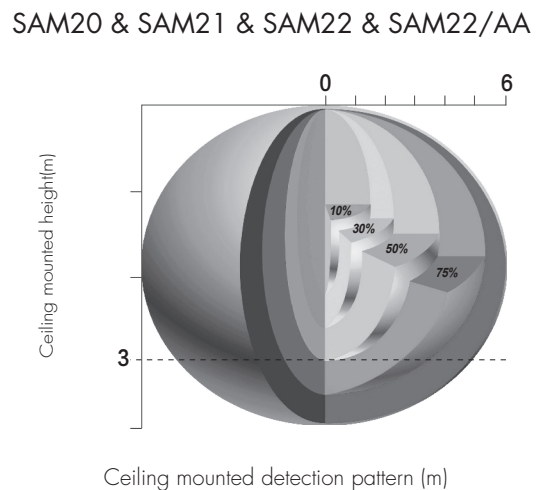
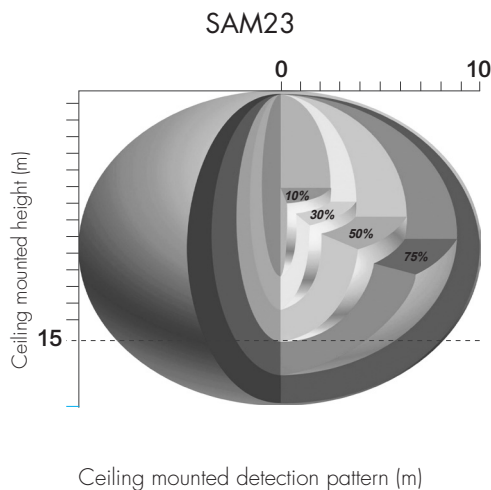
HIR11 series: High-bay lens detection pattern for **forklift** @ Ta = 20°C
(Recommended installation height **10m-15m**)

A: Tangential movement	B: Radial movement	Mount height	Tangential (A)	Radial (B)
		10m	max 380m² (Ø = 22m)	max 201m² (Ø = 16m)
		11m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
		12m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
		13m	max 452m² (Ø = 24m)	max 177m² (Ø = 15m)
		14m	max 452m² (Ø = 24m)	max 133m² (Ø = 13m)
		15m	max 452m² (Ø = 24m)	max 113m² (Ø = 12m)



HIR11 series: High-bay lens detection pattern for **single person** @ Ta = 20°C
(Recommended installation height **2.5m-12m**)

A: Tangential movement	B: Radial movement	Mount height	Tangential (A)	Radial (B)
		2.5m	max 50m² (Ø = 8m)	max 7m² (Ø = 3m)
		6m	max 104m² (Ø = 11.5m)	max 7m² (Ø = 3m)
		8m	max 154m² (Ø = 14m)	max 7m² (Ø = 3m)
		10m	max 227m² (Ø = 17m)	max 7m² (Ø = 3m)
		11m	max 269m² (Ø = 18.5m)	max 7m² (Ø = 3m)
		12m	max 314m² (Ø = 20m)	max 7m² (Ø = 3m)



Additional Information / Documents

1. To learn more about detailed product features/functions, please kindly refer to
<https://hytronik.com/product/hbem01>
2. Regarding precautions for Bluetooth product installation and operation, please kindly refer to
<https://hytronik.com/service/downloads> (Bluetooth Products Precautions for Product Installation and Operation)
3. Regarding precautions for Emergency LifePO4 Batteries, please kindly refer to
<https://hytronik.com/service/downloads> (LiFePO4 Battery Precautions and Usage)
4. Data sheet is subject to change without notice. Please always refer to the most recent release on
<https://hytronik.com/products/emergency-led-drivers-inverters>
5. Regarding Hytronik standard guarantee policy, please kindly refer to
<https://hytronik.com/service/downloads> (Guarantee Conditions document)